Alternative I

West-Side Conveyance and River Restoration Note: See list of Core Actions for additional activities included in this alternative. Some Core Actions are

included below when they are to be implemented at higher level.

Physical and Structural Features

Habitat Restoration

Activities	Benefits
 Restore shallow water (tidal) habitat in the Delta. Convert 4,000 to 6,000 acres of existing leveed lands to tidal actions. Include shallow water habitat in reconstruction of 50 to 100 miles of levees (coordinate with Flood Protection and Levee Stabilization activities). 	 Improves shallow water aquatic habitat. Increases the availability of forage, spawning, and rearing habitats and escape cover for: juvenile salmon Delta smelt splittail and longfin smelt other resident and anadromous fish
 Restore Delta riparian habitat. Improve riparian conditions on 500 to 700 acres of degraded riparian lands above the 200 to 400 acres improved through Core Action activities. Establish new areas of riparian habitat through acquisition of 1,000 to 2,000 acres of riparian land. 	 Increases the availability of riparian habitat. Improves the quality of riparian habitat within the Delta. Increases availability of shade and cover habitats for aquatic species. Provides spawning habitat for native and non-native fish. Improves rearing habitat for salmon and other species.
 Restoration of Delta (non-tidal) wetland habitat. Protect and enhance 200 to 400 acres of existing wetland habitats above the 100 to 300 acres protected through Core Action activities. Convert 3,000 to 5,000 acres of suitable lands to wetland habitats. 	Increases the availability of waterfowl and wildlife rearing habitats.
Restoration of Delta Terrestrial Habitat. Protect and enhance 600 to 1,000 acres of existing upland habitat above the 1,200 to 2,000 acres protected through Core Action activities.	 Improves quality of terrestrial habitat. Maintains or improves agricultural practices which benefit terrestrial species. Improves habitat of threatened and endangered species. Improves wildlife corridors.

Activities	Benefits
 Restoration of Suisun Bay habitat. Restore 1,500 to 2,500 acres to tidal wetland habitat. 	 Provides wet year spawning habitat for Delta smelt Provides rearing areas for salmon Provides waterfowl and wildlife habitat (e.g. canvasback and redhead ducks)
 Restore riverine habitat on the Sacramento River between Verona and Collinsville and along Delta channels. Set back levees to restore natural riverine cross sections to 40 to 60 miles of waterways. Reconstruct river banks and shallow water habitat on 75 to 100 miles of leveed banks along the Sacramento River. Protect and enhance 750 to 1,250 acres of riverine habitats on channel islands above the 500 to 1,000 acres protected through Core Action activities. 	Increases spawning and rearing habitat for: chinook salmon Delta smelt steelhead splittail striped bass other native and non-native fish species Increases availability of riparian-shoreline habitat for forage, escape, and cover areas for the aquatic and terrestrial species.
 Restore riverine channel features in the Sacramento River upstream of the Delta, including tributaries. Restore and enhance riparian vegetation on 20 to 40 miles of river upstream of the Delta between Verona and Colusa. Establish 20 to 40 river miles of meander belts above Colusa. 	 Increases natural fish productivity. Improves water quality and water supply reliability from the Sacramento River and its tributaries Improves food supply availability for fish. Improves wildlife habitat.
 Restore riverine channel features in the San Joaquin River upstream of the Delta, including tributaries. Restore channel configurations on 25 to 35 miles of degraded San Joaquin River to: deepen channel, and improve water temperatures. Isolate in-channel gravel quarry areas from main flows of the San Joaquin River and its tributaries. Restoration of floodway corridor habitat Modify floodways to convert 5,000 to 7,000 acres of productive agricultural lands to wetland habitat. Reduce fish stranding in accordance with Fish Protection and Transport actions. 	 Increases natural fish productivity. Improves water quality and water supply from the San Joaquin River and its tributaries. Improves (reduces) water temperature. Improves food supply availability for fish. Improves wildlife habitat. Provides more natural river corridor. Protects young fish from predation and straying. Provides spawning areas for Delta native fish. Improves wildlife habitat. Improves forage areas and escape cover for: juvenile salmon Delta smelt splittail other native and non-native fish species



- Delta Shallow Water Habitat Candidate areas restoration include Prospect Island, Liberty Island, Little Holland Tract, Hastings Tract, Yolo Bypass, and the southeast Delta.
- Delta Levee Habitat Candidate levees for habitat restoration include Twitchell Island along Threemile Slough and Sevenmile Slough, Georgiana Slough, and the North and South Forks of the Mokelumne River.
- Floodway Corridors Habitat restoration must not impair capacity of floodways.
- Suisun Bay Create tidal wetlands with dredge spoils between Collinsville and Carquinez Strait or convert diked wetlands to tidal wetlands.
- San Joaquin River Feasible and cost-effective habitat restoration and channel modifications.
- Riparian Habitat Coordinate with Flood Protection and Levee Stabilization actions.

Water Transport

Benefits Activities Construct a new, 2,000 to 7,000 cfs screened • Anadromous fish are not exposed to major diversion diversion facility on the Feather River system thereby reducing entrainment during export located at the Thermalito Afterbay to divert wet diversion. weather water and a conveyance facility to • Improves water quality because the diversion is transport water from the new diversion to new above major pollution sources. offstream storage on the west-side of the · Ability to capture significant wet weather flows that Sacramento Valley. would otherwise have to be released and transport Construct a new, 5,000 to 10,000 cfs screened them to storage. diversion facility on the Sacramento River system located at Shasta Lake and a new conveyance facility to transport water from the new diversion to new offstream storage on the west side of the Sacramento Valley. • Remove GCID and Tehama Colusa diversions from river and connect users to new conveyance storage facility. · Construct a new, 10,000 to 15,000 cfs west-side Improves water quality for export users. conveyance facility to transport water from the new Offers the capability to provide water supplies to offstream west-side storage point around the Delta to users on the North Bay Aqueduct, Contra Costa existing pumping plants in the south Delta. Canal, the Mokelumne Aqueduct, and the South Bay Aqueducts as well as to CVP and SWP export pumps. Improves water supply reliability by adding flexibility of a second diversion point upstream of most Delta native fish habitat. • May reduce carriage water losses in critical years thereby benefitting water supply. Creates a more efficient method of transporting



- Divert only during flood flows to minimize fisheries impacts.
- Siphons and canals will transport water across Delta to minimize environmental, water quality, and flood conveyance impacts.
- Provide turnouts from west-side Delta isolated conveyance facilities to stream flow augmentation points and to groundwater and conjunctive use areas on the west and east sides of the Sacramento Valley.
- Investigate the temporary use of the Red Bluff Diversion Dam and the Tehama Colusa Canal to convey water to West-side storage while constructing conveyance directly from Shasta Dam.
- A variation of this alternative wil be investigated that would divert water upstream of the Sacramento Weir and use the Sacramento Ship Channel or Yolo Bypass to convey water to a southern terminus where siphons and additional canals will transport water to the existing export facilities in the south Delta.

Water Storage

Activities	Benefits
Construct about 6 to 8 million AF of offstream storage on west-side of Sacramento Valley to store captured wet weather water.	 Adds new source of water supply for all beneficial users. Provides additional storage and operational flexibility.

Considerations

- Construct new offstream storage at locations such as Colusa-Sites Reservoir site or enlarge existing Berryessa Reservoir.
- Divert water into new storage facility during November, December, and January; release water from March to July as needed.
- Environmentally dedicated water in upstream storage allows reduction in diversions during critical fishery periods.
- Locate screened diversions as far away from critical habitat as feasible.

Fish Protection and Transport

Activities	Benefits
Continue to evaluate acoustic barrier at Delta Cross Channel to block outmigrating fish from entering the interior Delta.	Increases fish survival.Improves operational flexibility of facility.
Install fish screens on moderate and high priority diversions in the Delta, rivers, and tributaries.	Reduces entrainment of fish throughout the system.
Improve floodway drainage to reduce fish stranding by 30 percent.	Increases fish survival.



- Select diversions for screening according to criteria including size of intake, location, peril to fish, and screening feasibility.
- New intake at Italian Slough is designed to work in conjunction with the existing Clifton Court Forebay intake.

Flood Protection and Levee Stabilization

Activities	Benefits
 Implement a comprehensive Delta Long-Term Protection Plan at a modest level. For levee maintenance and stabilization actions to attain and maintain a uniform standard at or above the Hazard Mitigation Plan also to include recommended funding to improve 200 to 250 miles of levees currently below the HMP standard. To implement levee improvements and associated habitat improvements along 60 to 90 miles of Delta levees to the Corps P.L. 99 standard based on overall system resource benefits. 	 Reduces vulnerability of Delta land use and infrastructure to inundation. Reduces vulnerability of Delta water quality to salinity intrusion. Reduces vulnerability of Delta ecosystem functions to salinity intrusion and inundation. Provides greater opportunities for habitat restoration.
Improve flood conveyance capacity of Delta channels through channel maintenance actions (e.g. maintenance dredging) or in conjunction with levee upgrades and improvements.	 Reduces vulnerability of Delta functions to inundation. Improves flood conveyance capacity in high priority channels. Provides greater opportunities for habitat restoration.

Considerations

- Integrate protection and stabilization of levees with Delta habitat restoration activities.
- Candidate areas for P.L. 99 protection include, but are not limited to Sherman, Jersey, Bouldin, and Lower Roberts islands, and New Hope, Palm, and Lower and Upper Jones tracts.
- Channel improvements may include widening for improved conveyance, stabilizing berms, and related actions, should be integrated with levee improvements.
- Improvements to channels include dredging for sediment removal in channels with restricted flood capacity.
- Evaluate combination of floodway capacity and reservoir flood reservation.

Operational and Management Features

Water Supply Management

Activities	Benefits
 Encourage temporary land fallowing during drought periods to reduce dry year demand by approximately 300,000 to 500,000 AF through us of incentives and other programs. Permanently retire approximately 70,000 to 100,000 acres of marginally producing agricultural lands and lands from willing sellers through use of incentives and land purchases. 	 Reduced demand for Delta water exports. Could make water available for drought-year transfers. Provides water quality benefits in the San Joaquin River and south Delta by retiring marginally producing lands that drain to the San Joaquin River. Reduces slightly the total salt load to the San Joaquin Valley.
Expand groundwater banking and extensive conjunctive use programs in the San Joaquin and Tulare Lake Basin integrated with surface storage.	 Improves water supply reliability during drought conditions. Reduces groundwater over-draft conditions in the San Joaquin Valley and Tulare Lake Basin.
 Increase the implementation of municipal and industrial water conservation to reduce demand by 200,000 to 300,000 AF over current implementation commitments. Use incentives or other means to achieve implementation of Best Management Practices (BMP's) by more suppliers and water users. Expand the BMP's to include additional practices and higher implementation rates. Increase the level of agricultural water conservation to reduce demand by an additional 200,000 to 400,000 AF. Use incentives or other means to achieve implementation of Efficient Water Management Practices (EWMP's) by more suppliers and water users. Expand the EWMP's to include additional practices. 	 Reduces overall water demand. Could make water available for drought year transfers. May improve overall Delta and tributary water quality through retention of agricultural drainage water for release when pulse flows can provide dilution.
Investigate wholesale inclining block rates and water pricing structures for water users to encourage conservation activities.	Reduced demand for Delta water exports. Provides incentive for increased efficient use of water.

Activities	Benefits
 Implement urban wastewater reclamation programs to develop approximately 100,000 to 200,000 AF of additional water supply. Reclamation projects could include: recharging groundwater, using for agricultural irrigation, recycling and treating for potable or non-potable urban use, use of grey water, and storage and use for salinity intrusion. Treat and recycle agricultural drainage for irrigation agrees to reduce agricultural drainage. 	 Reduces demand for Delta water exports. Could make water available for drought-year transfer. Can improve Delta and San Joaquin River and export water quality depending on reclamation activity.
irrigation purposes to reduce export demand where feasible while maintaining appropriate salt leaching requirements.	
Develop an incentive driven program to modify upstream reservoir releases on all tributaries to maximize coordination with water quality, fish and wildlife, and water supply needs.	Improves flexibility of system operations.Increases water supply reliability.

- Emphasis for land retirement will be placed on land which contributes to regional drainage problems and/or is marginally productive. In-Delta land retirement can reduce diversion effects, assist with actions to control subsidence, and improve water quality.
- Maximize the potential for temporary fallowing (such as rotational fallowing). Land fallowing upstream of the Delta may reduce Delta inflows and may also be available for use in water transfers.
- Reclamation and reuse programs would focus on facilities that currently discharge treated wastewater to salt sinks or other degraded bodies of water which are not reusable.
- Conjunctive use and groundwater storage programs can include in-lieu operations which focus on providing
 adequate deliveries of surface water in wet years and lower deliveries in dry years. Groundwater stored south of
 the Delta would be used in-lieu of surface deliveries during dry years and seasonally to marginally offset Delta
 exports during fish sensitive periods.
- Agricultural conservation values shown only include conservation of water lost to salt sinks or other degraded bodies of water which are not reusable.

Water Diversion Management

Activities	Benefits
Acquire about 100,000 AF of water from willing sellers in the San Joaquin Valley or develop from	Transports fish through the San Joaquin River and Delta.
expanded surface water or groundwater storage.	Improves water quality.
	 Improves management flexibility for diversions to reduce fish losses.



Activities	Benefits
Improve CVP and SWP operations through predation control and coordinating operations.	 Reduces fish losses. Improves CVP/SWP coordinated operations to include "joint point of diversions and use." Allows water pumped by either project to be used by both projects.
Improve real-time monitoring for presence of fish species of special concern and modify water diversions to avoid fish entrainment.	 Provides an additional tool to help reduce entrainment of special-concern species. Improves flexibility to divert water during critical fish migration periods.

- San Joaquin environmental water can be used for pulse flows for fish transport or diluting poor quality flows.
- Improve CVP/SWP coordinated operations to include "joint point of diversion and use". Allows water pumped by either project to be used by both project users.
- Investigate the feasibility of wheeling and exchanging water to augment San Joaquin River flows.

Fisheries Management

Activities	Benefits
Mark salmon produced in hatcheries.	Facilitates selective catch of hatchery salmon by commercial and recreational fisheries.
Considerations	
• Actions are intended to maintain recreational and commercial fisheries as well as enhance native salmon stocks.	
Need to assess impact of incidental mortality on native (unmarked) fish.	

Water Quality Management

Activities	Benefits
Manage drainage timing (i.e. restrict drainage discharges by 40 to 50 percent during periods of low Delta inflow) to reduce instream impacts to water quality.	 Reduces the concentration of pollutants entering the Delta and its tributaries during low flow periods and allows better coordination of discharges and dilution flows.
Improve management of urban stormwater runoff to retain an additional 20 to 30 percent of runoff volume contained presently.	• Improves Delta water quality by reducing the volume of urban stormwater runoff and concentration of pollutants entering Delta tributaries.
Construct wetlands to treat 3,000 to 5,000 AF of upstream wastewater effluent.	 Improves Delta water quality by allowing some filtration and reduction in biological oxygen demand to result from constructed wetland treatment.



Activities	Benefits
 Increase enforcement of source control regulations for agricultural drainage to moderately: Reduce leachate concentrations and volumes. Restrict spray programs adjacent to waterways. Reduce runoff volumes. Reduce the concentrations of pollutants in runoff. 	Reduces in-Delta and tributary surface water concentrations of pesticides (herbicides, fumigants, fungicides), fertilizers, concentrated mineral salts, and microbial agents from agricultural drainage.
Coordinate incentives for developing efficient water management practices with Water Supply Management actions.	Improves overall Delta and tributary water quality by more efficient management and therefore reduced applications of water and chemicals.
Coordinate fallowing or retirement of agricultural lands with severe, costly drainage problems with Water Supply Management actions.	Reduces volume of drainage water and constituent pollutant contributions to Delta and tributary surface waters.
Implement modest on-site mine drainage remediation measures developed in site specific studies at the Walker Mine, Malakoff Diggins, Leviathon Mine, Iron Mountain Mine and Penn Mine sites, and control runoff from those and other high priority mine sites based on current water quality objectives for pollutants.	Reduces future Delta and Sacramento River heavy metals loading.
Study and implement actions to reduce effects of salinity in the San Joaquin River, to maintain water levels and circulation in the south Delta, and to reduce recycled salt load to the San Joaquin Valley.	 Better manage flow circulation. Increase water stages for the south Delta. Improve San Joaquin River and south Delta water quality.

- Retire lands that directly contribute to degraded water quality conditions in the Delta and its tributaries.
- Prioritize agricultural drainage sites for drainage management, such as west-side of San Joaquin Valley, Panoche Creek area, etc.
- Evaluate potential to give urban areas flexibility to fund high priority mine remediation in-lieu of increasing expenditures on treatment plant improvements.
- · Potential benefits of south Delta stage, circulation, and water quality actions need to be verified.
- Evaluate the feasibility of developing additional water suppliers on the San Joaquin River for water quality dilution.
- Wetlands treatment will be initiated as a "pilot program" to establish its feasibility and expanded appropriately.

Management of System Vulnerability



Activities	Benefits
Establish landside buffer zones adjacent to some levees on islands with deep peat soils.	 Buffer zones provide an increase in stability of adjacent levees. Conversion to wetlands provides long-term increases in stability of Delta levees and reliability of Delta functions by reversing subsidence.
 Establish and recommend extensive funding for an emergency levee management program which provides funding and direction for reclaiming Delta islands in the event of levee failures and for the continued protection of Delta functions. Identify extensive funding sources for continuing levee maintenance activities beyond the planing horizon of this program. Identify funding sources for a continuing levee stabilization program that will work beyond the planning horizon of this program towards improving all important Delta levees to a P.L. 99 standard. 	 Ensures suitable funding, equipment and materials availability, and coordination to rapidly respond to levee failures. Provides funding for continued maintenance of levees to protect Delta functions. Increases the reliability for water supply needs from the Delta.

- Determine extent and cost effectiveness of levee improvements and buffer zone programs.
- Buffer zones may be managed to provide wildlife habitat.
- Candidate islands for subsidence control include, but are not limited to Grand, Twitchell, Sherman, Andrus, and Bouldin.
- Emergency levee management program would not replace other levee maintenance or improvement programs.
- Levee maintenance funding would be based upon continuation, possibly at a slightly higher level, of a program like the SB 34 program, which currently funds maintenance activities. SB 34 is set to expire in 1997.

Institutional and Policy Features

Habitat Programs

Activities	Benefits
Integrate recommended habitat restoration actions from other federal and state programs, including the Anadromous Fish Restoration Program.	 Provides additional habitat restoration. Provides coordination between habitat restoration programs.
Establish a CALFED Regulatory Team to coordinate and expedite habitat restoration permits.	Accelerates acquisition of permits for environmental restoration projects and other CALFED projects.
Establish a program to identify and use clean dredge materials from the Delta for habitat restoration and levee maintenance in the Delta.	Provides materials for habitat and levee improvements



Activities	Benefits	
Encourage and provide incentives for farmers and levee maintenance districts to leave habitat areas undisturbed through working with resource agencies.	 Protects existing habitats. Increases flexibility in maintenance programs. 	
Considerations		
Coordinate activities to avoid duplication.		

CALFED Regulatory Team would be comprised of key personnel from CALFED member agencies.

Water Quality Protection

Activities	Benefits
 Increase enforcement of source control regulations for urban and industrial runoff. 	 Improves Delta water quality by enforcing real economic penalties for discharge violations.
Activities	Benefits
• Coordinate with on-going or planned watershed management programs that promote and protect Delta water quality and fishery benefits.	Increases level of protection of Delta water quality and in-Delta and anadromous fish habitats.

Considerations

- Prioritize sources and pollutants of concern and direct enforcement activities accordingly.
- Coordination with other watershed management programs could include programs outside of CALFED's geographic scope.



Water Supply Management

Activities	Benefits
• Establish incentives for long-term conjunctive use in the Sacramento and San Joaquin valleys and ease institutional barriers.	Reduces dry year demand for Delta water exports.Could make water available for transfers.
 Long-term planning for drought contingencies. Create a coordinated CALFED program to expedite and expand the use of water transfers to meet water needs during droughts. Ease institutional barriers to facilitate water 	 Improve drought response planning. Increases water supply reliability. Can be integrated with conjunctive use programs. Increases the efficiency of implementing water
 Ease institutional partiers to facilitate water transfers. Improve planning and coordination procedures for water transfers. Improve operational procedures to facilitate water transfers. Establish a water transfer brokering mechanism or institution. 	 Increases the efficiency of implementing water transfers. Increases financial position of otherwise economically marginal projects that increase water supply flexibility. Increase water supply reliability, predictability, and flexibility.
 Improve coordination of land use and water supply planning. Develop incentives for local and regional coordination of land use and water supply planning. Implement long-term institutional measures to increase coordination of state/federal project planning and operation with local and regional project planning and operation. 	 Provides greater flexibility for short-term transfer water during drought contingencies. Increases the efficiency of water supply planning. Ensures beneficial uses of existing water supplies.

Considerations

- Determine institutional needs to implement long-term drought planning programs.
- Determine institutional requirements for augmenting California Water Codes to facilitate water transfer procedures.
- Evaluate the use of a Delta central planning institution to manage inflows, transfers, export operations, and outflows.

